

kled with cinereous, and with the apex truncate. Below with a broad black shining stripe in the middle.

Only one specimen. In my collection.

ANCYLONOTUS, Cast., Lac.

Ancylonotus tribulus, Fab. Syst. El. ii. 281.

This well-known African species does not seem to be so common at Old Calabar as elsewhere on the west coast. It has only come once or twice.

[To be continued.]

VI.—On *Saurocetes argentinus*, a new Type of Zeuglodontidæ. By Dr. HERMANN BURMEISTER.

[Plate I.]

THE public museum of Buenos Ayres has lately received the under jaw of a very interesting fossil mammalian, which I beg leave to describe, under the above denomination, as an entirely new type belonging to the curious tribe of Zeuglodontidæ. This specimen was generously presented to the museum by Dr. D. Manuel Montes de Oca, Professor of Physiology in the Medical Faculty of Buenos Ayres. That patriotic gentleman having noticed the great interest taken by me in it when looking over his valuable collection, offered me the opportunity of examining the bones and describing them for the benefit of science, which I am glad to acknowledge here with well-merited thanks.

Respecting the locality where the fossil was found, M. Montes de Oca could say nothing; he received it from one of his patients, who brought him the bones, broken as they are, from the interior of the country, as a contribution to his collection. But the adherent remains of the formation in which the bone was discovered prove very clearly that the fossil was taken out of a sandy bed of the great Tertiary formation on the shores of the river Paraná, which D'Orbigny has named the "*Formation patagonienne*." This formation, described by Darwin, D'Orbigny, Bravard, and myself*, is chiefly a marine deposit mixed with beds of freshwater deposition, wherein are found many bones of freshwater fishes (*Siluridæ*), of *Crocodylidæ*, and even of terrestrial Mammalia. We have in the museum of Buenos Ayres bones of all these animals,

* Reise durch die La Plata-Staaten, tom. i. p. 410 (Halle, 1861, 8vo); Anales del Museo Publico de Buenos Aires, tom. i. p. 114.

and also the occipital part of a skull, which has so much resemblance to that of *Anoplotherium grande* (Blainville, *Ostéogr.* pl. 8) that we may infer the existence of this Tertiary form in South America during the Later Tertiary epoch. Bravard, in his 'Monografía' of the formation (Paraná, 1858, p. 45), mentions the same genus, represented by a first molar tooth of the animal; and I must confirm his discovery as very probable by the part of the skull in my hands, which, unfortunately, has no teeth, but only the occipital, parietal, and the mastoid portion of the temporal bone complete.

Marine Mammalia are rare. Bravard describes some portions of a whale (*Balena dubia*, p. 34) as the only marine mammiferous animal known to him. I had the good fortune to find, during my residence in Paraná, the tooth of an *Otaria* (Reise, i. 431) in a bed of sandy clay exactly like the adherent portions of the formation on the lower jaw now to be described; and therefore I may assert with good reason that my *Saurocetes* must be of the same epoch and from nearly the same locality.

The fragment of the lower jaw is the middle portion of the whole, containing the hinder part of the two united half-jaws and the beginning of the two articular branches, which are broken off, as is also the whole front of the jaw. The remaining portion, shown in Pl. I. fig. 1, of half the natural size, from the left side, is on this side 15 inches long and $2\frac{1}{2}$ inches high at the highest region of the jaw, before the separation of the two articular branches, but only $1\frac{3}{4}$ inch at the beginning, under the first tooth. On the right side the articular branch is broken off; but a somewhat longer portion is well preserved, so that the whole length is 3 inches more—say 18 inches. But as a piece of the jaw is wanting on this side, I could not figure the right branch in its true position, and have given a separate figure of it (fig. 4) from the outside, also of half the natural size. The closed anterior portion of the jaw is 11 inches long and $1\frac{1}{2}$ inch broad at the tip, but $2\frac{1}{6}$ inches at the hinder part. Its transverse figure is an equilateral triangle with outwardly curved sides and a rounded inferior edge; the interior is entirely of compact osseous substance, with only two small open channels at the lower part. These two open channels (*canales alveolares*) are separated by a very thin osseous septum (fig. 2), which, like the channels themselves, rises much higher behind, so that each channel expands into a large open cavity in the interior of the two articular branches of the jaw in the same manner as in the lower jaws of the *Delphinidæ*, to which this lower jaw seems to have been very similar in construction, and especially to that of *Pontoporia* as

it is figured in my 'Annals of the Public Museum of Buenos Ayres,' tom. i. pl. 26. fig. 2.

The superior part of the anchylosed portion of the jaw contains the alveoles for the teeth, whereof there are on the left side twelve, and seven on the right, wanting the hinder portion of this side of the jaw before the separated articular branch. Each alveole reproduces completely the figure of the roots of the teeth; it is, like them, divided at the lower end into two branches, and united by a very small short passage with the alveolar channel in the interior of the jaw (fig. 2). As some of the alveoles are open in the broad portion of the right side of the jaw, I could see the whole figure of them very clearly, and distinguish well the small and very short passage leading into the open channel of the interior of the jaw. In this hinder region of the anchylosed portion of the jaw, where the alveolar channel is much larger, even the tips of the roots of each tooth pass into the channel, so that they are seen like protuberances on the superior, larger side of the channel.

The upper surface of the anchylosed portion of the jaw between the teeth is moderately convex, with a median impressed line as the remains of an anterior suture which has united the two half-jaws to each other. On the opposite or lower surface no trace of suture is visible in the anterior portion of the jaw; but it is sufficiently conspicuous at the hinder end, before the separation of the two articular branches. The outside of the jaw is peculiarly wrinkled, and furnished with a very well-marked furrow on each side along the lower region (see fig. 1), which is narrower and deeper at the anterior end. From this furrow the wrinkles begin in an oblique direction, ascending from behind forwards, and growing somewhat smaller and less strongly marked. The furrow does not continue further back than to the end of the anchylosed portion, vanishing here completely. But the two articular branches have also similar but more horizontal wrinkles on the outside, as shown in figs. 1 & 4. It is worth notice that some of the *Delphinidæ*, like *Pontoporia* (see my figure, *l. c.*), have the same furrow on the anchylosed portion of the under jaw.

With respect to the teeth, the generic character of the animal is founded on the circumstance that all the teeth are of the same form, and not different, like those of *Zeuglodon* or *Basilosaurus*. In a paper published at Halle in 1847*, I have shown by figures that *Zeuglodon* has at least three different forms of teeth:—one with single crown and root; a second with a great conoidal crown to which are attached one

* Bemerkungen über *Zeuglodon cetoides*, Owen, *Basilosaurus*, Harlan, *Hydrarchus*, Koch, &c. 4to, with figure. Halle: Schwetcke & Sohn.

or two smaller cones, and a subdivided root on the end; and a third class of large molars, with two great equal roots and a higher compressed crown of from six to nine conoidal knobs, of which the central one is the most prominent and highest. It seems probable that the first class of teeth with the single crown were the foremost, the second the following on each side (corresponding to the false molars), and the third class the true molars of the hinder end of the series. In our *Saurocetes* no such difference occurs; all the teeth are of the same form, corresponding in structure rather to the second class of the teeth of *Zeuglodon* than to the first and third. Every tooth has a single conoidal crown, somewhat curved backward and compressed on both sides, covered, like the teeth of *Zeuglodon*, with a distinct layer of enamel, irregularly wrinkled on the external surface, as may be seen in fig. 3, which shows one tooth of the natural size*. Below the crown is a small and narrow cingulum, corresponding to the part of the tooth enclosed in the gum and outside of the jaw; a similar cingulum is also seen in the second class of teeth of *Zeuglodon* (see my cited account, fig. 7). Below this cingulum begins the root, enclosed in the alveole of the jaw, like a turnip, at first somewhat thickened and soon after more compressed from the sides, descending in the interior of the jaw, with two branches separated only at the end, which diverge somewhat from each other. The first or anterior is always somewhat thicker, but shorter; the second longer, thinner, and more prominent, is generally accompanied by another small knob at the beginning. The whole tooth is 2 inches high, of which the crown measures 8 lines, the cingulum $1\frac{1}{2}$ line, and the root 15 lines. All the nine teeth present in the jaw (namely, six on the left side and three on the right side) are of the same figure, without any difference except in size, the posterior teeth being somewhat smaller, as is also the case in the teeth-series of the living *Delphinidæ*.

The portion of the articular branch of the right side figured in Pl. I. fig. 4 begins with the alveole of the last tooth, and is from that point 5 inches long. Under the alveolar groove the piece is $2\frac{1}{3}$ inches high, and $1\frac{1}{2}$ inch broad, enclosing an open channel $1\frac{1}{4}$ inch high and $\frac{3}{4}$ inch broad. From this point the jaw enlarges more and more behind, so that the fragment terminates with a height of $3\frac{1}{3}$ inches and a width of $1\frac{2}{3}$ inch, with an open cavity in the interior $2\frac{3}{4}$ inches high and $1\frac{1}{2}$ inch broad. The osseous substance forming the branch is much thicker at the anterior than at the hinder end, measuring there

* In the plate the figure of the tooth is erroneously stated to be half the natural size.

on the upperside more than half an inch, and on the hinder end less than a quarter of an inch. The interior is entirely open, with a smooth surface; the outside has the same impressed wrinkles as the anchylosed part of the jaw on the exterior surface, but much smaller wrinkles on the interior, where the two branches are united to each other. Here the structure of the surface is finer, and the bone more delicate. As a part of this surface is broken off, I cannot ascertain the extent of the opening of the alveolar channel, which was on this side of the articular branch. The only particular character which I see here is the presence of a sharp edge on the lower border of the branch, beginning a little behind the alveole of the last tooth, and increasing in elevation behind.

Finally, comparing the known part of the animal with the lower jaw of *Zeuglodon*, there is no doubt that *Saurocetes* was an animal of much smaller size. Supposing that the broken tip of the lower jaw was 7-8 inches long, and the wanting end of the articular branches 5-6 inches, we may presume that the whole lower jaw had an extent of 30-32 inches; and in this case the whole skull may have been 38-40 inches or $3\frac{1}{2}$ feet long, *preter propter*. If that is true, the whole animal (if it had the figure of a dolphin like *Pontoporia*) may have been 15-16 feet long, as we know from my description that the skull occupies one fifth part of the entire body; or if we judge from the elongated figure of the lumbar vertebræ of *Zeuglodon* that *Saurocetes* had an analogous configuration, its total length may have been no more than 20 feet.

VII.—*Observations on the Species of Atax parasitic upon our Freshwater Mussels.* By EMIL BESSELS*.

IT is comparatively but a short time since the embryology of the Arthropoda received far less attention than this interesting branch of science really deserved; and yet, since the classical memoir of Weissmann upon the development of the Diptera, it may almost be said to have become a favourite study with zoologists. In the course of the last few years there have appeared a series of works upon this subject, such as Mecznikow's embryological studies on insects and Dohrn's on the embryonic development of *Asellus aquaticus*, whilst Kupffer subjected the folded lamina (*Faltenblatt*) discovered by Weissmann to a thorough examination. Claparède promises us, in a memoir hereafter to be mentioned, further contributions; and quite

* Translated by W. S. Dallas, F.L.S., from the 'Württembergische naturwissenschaftliche Jahreshefte,' 1869, pp. 146-152.